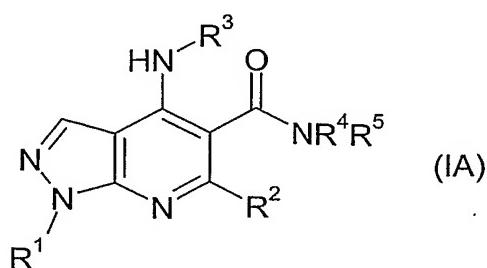


Claims

1. 4-{{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide or a salt thereof.
- 5 2. 4-{{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide or a pharmaceutically acceptable salt thereof.
- 10 3. 4-{{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide.
4. A compound or salt as claimed in claim 2, wherein the pharmaceutically acceptable salt includes a pharmaceutically acceptable acid addition salt.
- 15 5. A compound or salt as claimed in claim 2, wherein the pharmaceutically acceptable salt is a pharmaceutically acceptable acid addition salt.
6. A compound or salt as claimed in claim 4 or 5, wherein the pharmaceutically acceptable acid addition salt has been formed by combination of 4-{{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide with a pharmaceutically acceptable acid having a pKa of 1.5 or less.
- 20 25 7. A compound or salt as claimed in claim 4 or 5, wherein the pharmaceutically acceptable acid addition salt of the 4-{{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide comprises a hydrobromide, hydrochloride, sulfate, nitrate, phosphate, p-toluenesulfonate, benzenesulfonate, methanesulfonate, ethanesulfonate, or naphthalenesulfonate salt thereof.
- 30 8. 4-{{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide hydrochloride.
- 35 9. A method of preparing a compound of formula (IA), or a salt thereof:

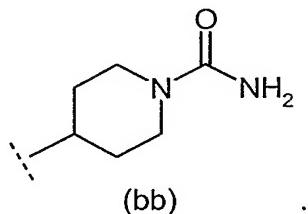


wherein:

R^1 is ethyl;

R^2 is a hydrogen atom (H);

R^3 is an N-aminocarbonyl-piperidinyl group of sub-formula (bb) which is not substituted on a ring carbon:

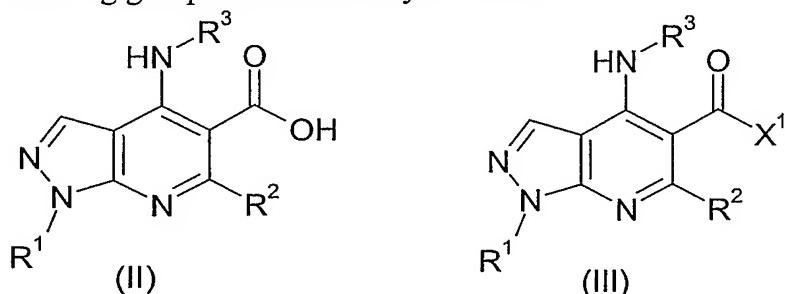


R^4 is a hydrogen atom (H);

and R⁵ is (3,4-dimethylphenyl)methyl;

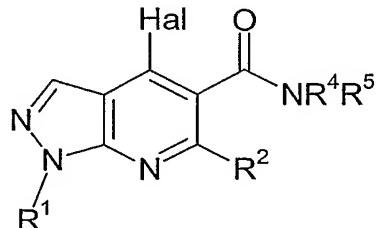
10 wherein the method comprises:

(a) converting a compound of formula (II) into an activated compound of formula (III) wherein X^1 = a leaving group substitutable by an amine:



15 and subsequently reacting the activated compound of formula (III) with an amine of
formula R^4R^5NH ; or

(b) reacting a compound of formula (VIIA):

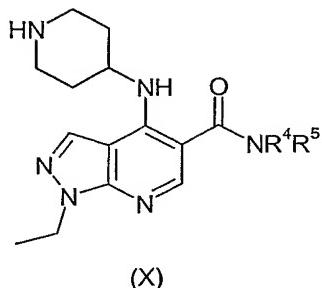


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(VIIA)

wherein Hal is a chlorine, bromine or iodine atom, with an amine of formula R^3NH_2 or a salt thereof; or

(c) reacting a compound of formula (X) or a salt thereof

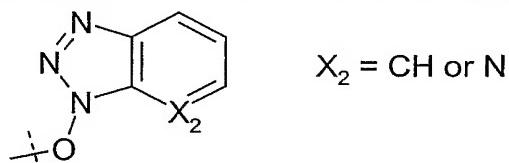


5 with a urea-forming reagent capable of converting the (4-piperidinyl)amino group in the compound of formula (X) into a [(1-aminocarbonyl)-4-piperidinyl]amino group;

and, in the case of (a), (b) or (c), optionally converting the compound of formula (I) into a salt thereof; or

10 (g) in a method of preparing a pharmaceutically acceptable salt of the compound of formula (I), converting the compound of formula (I) or a salt thereof into the desired pharmaceutically acceptable salt thereof.

15 10. A method as claimed in claim 9, wherein the activated compound of formula (III) is the acid chloride, or the activated compound of formula (III) is an activated ester



wherein the leaving group X^1 is

20 11. A method as claimed in claim 9 or 10, wherein, in formula (VIIA), Hal is a bromine atom or a chlorine atom.

12. A method as claimed in claim 9, 10 or 11, wherein in step (c) the urea-forming reagent is trimethylsilyl isocyanate.

25 13. 4-{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[{(3,4-dimethylphenyl)methyl]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide or a pharmaceutically acceptable salt thereof for use as an active therapeutic substance in a mammal such as a human.

30 14. A compound or salt as claimed in claim 13, for use in the treatment and/or prophylaxis of an inflammatory and/or allergic disease or cognitive impairment or depression in a mammal such as a human.

15. A compound or salt as claimed in claim 13, for use in the treatment and/or prophylaxis of atopic dermatitis in a human.

16. A compound or salt as claimed in claim 13, for use by external topical administration in the treatment and/or prophylaxis of atopic dermatitis in a human.

17. The use of 4-{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide or a pharmaceutically acceptable salt thereof in the manufacture of a medicament for the treatment and/or prophylaxis of an inflammatory and/or allergic disease, cognitive impairment or depression in a mammal such as a human.

18. The use as claimed in claim 17, wherein the medicament is for the treatment and/or prophylaxis of chronic obstructive pulmonary disease (COPD), asthma, rheumatoid arthritis, allergic rhinitis, psoriasis or atopic dermatitis in a mammal such as a human.

19. The use as claimed in claim 17, wherein the medicament is for the treatment and/or prophylaxis is of atopic dermatitis in a mammal.

20. The use as claimed in claim 19, wherein the mammal is a human.

21. The use as claimed in claim 19 or 20, wherein the medicament is for external topical administration to the mammal.

25. 22. A method of treatment and/or prophylaxis of an inflammatory and/or allergic disease, cognitive impairment or depression in a mammal such as a human in need thereof, which method comprises administering to the mammal a therapeutically effective amount of 4-{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide or a pharmaceutically acceptable salt thereof.

30. 23. A method of treatment and/or prophylaxis of atopic dermatitis in a mammal in need thereof, which method comprises administering to the mammal a therapeutically effective amount of 4-{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide or a pharmaceutically acceptable salt thereof.

35. 24. A method of treatment and/or prophylaxis of atopic dermatitis in a human in need thereof, which method comprises administering to the human a therapeutically effective amount of 4-{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-

1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide or a pharmaceutically acceptable salt thereof.

25. A method as claimed in claim 23 or 24, comprising external topical administration
5 of the compound or salt to the mammal (e.g. human).
26. A pharmaceutical composition comprising 4-{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide or a pharmaceutically acceptable salt thereof, and one or more
10 pharmaceutically acceptable carriers and/or excipients.
27. A pharmaceutical composition as claimed in claim 26, which is suitable for external topical administration to a human.
- 15 28. A pharmaceutical composition as claimed in claim 27, wherein the 4-{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide or the pharmaceutically acceptable salt thereof is present at 0.1% to 3% by weight of the composition (w/w).
- 20 29. A pharmaceutical composition as claimed in claim 27, which is an ointment comprising:
- 4-{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide or a pharmaceutically acceptable salt thereof present at 0.1% to 3% w/w;
25 - an oil phase (oily ointment base) present at 25% to 99% w/w;
- one or more surfactants present in total at 0.5% to 10% w/w; and
- one or more agents acting as a skin-penetration enhancer present in total at 0.5% to 50% w/w.
- 30 30. A pharmaceutical composition as claimed in claim 29, which is an ointment comprising:
- 4-{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide or a pharmaceutically acceptable salt thereof present at 0.2% to 1.5% w/w;
35 - an oil phase (oily ointment base) present at 50% to 80% w/w, and comprising white petrolatum present at 45 to 75% w/w, and also comprising mineral oil present at 2.5% to 15% w/w;
- one or more surfactants present in total at 3% to 10% w/w; and
- one or more hydrophilic agents acting as both a solubiliser and skin-penetration
40 enhancer, present in total at 5% to 50% w/w;
wherein, in the ointment composition, the oil phase (oily ointment base) and the hydrophilic solubiliser/penetration-enhancer phase have been emulsified to form an ointment emulsion.

31. A pharmaceutical composition as claimed in claim 27, which is a water-in-oil cream comprising:

- 4-{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-
5 1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide or a pharmaceutically acceptable salt thereof present at 0.1% to 3% w/w;
- an oil phase (oily ointment base) present at 25% to 85% w/w;
- water present in 2% to 30% w/w;
- one or more surfactants present in total at 0.5% to 12% w/w; and
10 - one or more agents acting as a skin-penetration enhancer present in total at 0.5% to 50% w/w.

32. A pharmaceutical composition as claimed in claim 31, which is a water-in-oil cream emulsion comprising:

- 4-{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-
15 1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide or a pharmaceutically acceptable salt thereof present at 0.2% to 1.5% w/w;
- an oil phase (oily ointment base) present at 35% to 70% w/w, and comprising white petrolatum present at 30% to 65% w/w, and also comprising mineral oil present at 2.5%
20 to 15% w/w;
- water present in 5% to 25% w/w;
- one or more surfactants present in total at 3% to 10% w/w; and
- one or more hydrophilic agents acting as both a solubiliser and skin-penetration enhancer, present in total at 5% to 50% w/w.
25

33. A pharmaceutical composition as claimed in claim 27, which is an oil-in-water cream comprising:

- 4-{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-
30 1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide or a pharmaceutically acceptable salt thereof present at 0.1% to 3% w/w;
- an oil phase (oily ointment base) containing one or more ingredients capable of acting as emollients, the oil phase being present at 20% to 60% w/w;
- water present in 15% to 75% w/w;
- one or more surfactants present in total at 0.5% to 12% w/w; and
35 - one or more agents acting as a skin-penetration enhancer, present in total at 0.5% to 50% w/w.

34. A pharmaceutical composition as claimed in claim 33, which is an oil-in-water cream emulsion comprising:

- 4-{[1-(aminocarbonyl)-4-piperidinyl]amino}-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-
40 1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide or a pharmaceutically acceptable salt thereof present at 0.2% to 1.5% w/w;

- an oil phase (oily ointment base) containing one or more ingredients capable of acting as emollients, the oil phase being present at 30% to 55% w/w;

- water present in 15% to 50% w/w;

- one or more surfactants present in total at 3% to 10% w/w; and

5 - one or more hydrophilic agents acting as both a solubiliser and skin-penetration enhancer, present in total at 5% to 50% w/w;

wherein the oil phase comprises mineral oil present at 20% to 45% w/w, and/or comprises microcrystalline wax present at 5% to 25% w/w, and/or comprises a silicone

10 such as dimethicone present at 0.5% to 10% w/w.